

Patent claims

Sub 2
a5
1. Footwear with an upper (11) and a sole construction having an outsole (19; 39), in which: the upper (11) is constructed with an outer material (13) and with a waterproof functional layer (15) at least partially lining the outer material (13) on the inner side of the latter and having an upper end region on the sole side with an outer-material end region (21) and a functional-layer end region (23), the outsole (19) is joined to the upper end region, the functional-layer end region (23) has an edge region which is not covered by the outer-material end region and an adhesive zone which is closed in the direction of the sole periphery and comprises a reactive hot-melt adhesive (33) which brings about waterproofness when in the fully reacted state is applied to the edge region.

2. The footwear as claimed in claim 1, in which the edge region is formed by an overhang (25) projecting beyond the outer material end region (21) of the functional-layer end region (23).

3. The footwear as claimed in claim 1 or 2, with reactive hot-melt adhesive (33) in the form of PU reactive hot-melt adhesive.

4. The footwear as claimed in claim 1, 2 or 3, with reactive hot-melt adhesive (33), which contains particles which can be heated by means of irradiation.

5. The footwear as claimed in claim 4, in which the particles are selected from a particle group containing carbon particles and metal particles.

Sub 3
a5
6. The footwear as claimed in one of claims 1 - 5, in which the outsole (19; 39) is adhesively bonded to the upper end region by means of outsole cement (35) applied to it.

7. The footwear as claimed in one of claims 1 - 6, in which the reactive hot-melt adhesive (33) extends over the entire edge region (25).

8. The footwear as claimed in one of claims 1 - 7, in which the upper end region extends essentially perpendicular to the tread of the outsole (19; 39) and the functional-layer end region (23) projects beyond the outer-material end region (21) in the direction of the tread.

9. The footwear as claimed in one of claims 1 - 7, in which the upper end region extends essentially parallel to the tread of the outsole (19; 39) and the functional-layer end region (23) projects beyond the outer-material end region (21) in the direction of the center of the outsole.

10. The footwear as claimed in one of claims 1 - 9, with an insole (17), to which the functional-layer end region (23) is fastened.

11. The footwear as claimed in claim 10, in which the functional-layer end region (23) is joined to the insole (17) by means of a seam (31).

12. The footwear as claimed in claim 9, in which the functional-layer end region (23) is kept essentially parallel to the tread of the outsole (19; 39) by means of a first string-lasting (45).

13. The footwear as claimed in one of claims 1 - 12, in which the outer-material end region (21) is fastened to the functional layer (23) by means of fixing adhesive (43).

14. The footwear as claimed in one of claims 1 - 13, in which the overhang (24) is bridged by a connecting strip of a material permeable to liquid reactive hot-melt adhesive (33) and the reactive hot-melt adhesive (33) has been applied to an outer side of the connecting strip.

15. The footwear as claimed in claim 14, in which the connecting strip is constructed with a gauze strip (27).

16. The footwear as claimed in claim 15, in which a first longitudinal side of the gauze strip (27) is fastened to the outer-material end region (21).

17. The footwear as claimed in claim 16, in which the first longitudinal side of the gauze strip (27) is sewn to the outer-material end region (21).

18. The footwear as claimed in one of claims 15 to 5 17, in which a second longitudinal side of the gauze strip (27) is fastened to the functional-layer end region (23).

19. The footwear as claimed in claim 18, in which the second longitudinal side of the gauze strip (27) is 10 sewn to the functional-layer end region (23).

20. The footwear as claimed in one of claims 16 - 19, in which the second longitudinal side of the gauze strip (27) is fastened to the insole (17).

21. The footwear as claimed in claim 20, in which 15 the second longitudinal side of the gauze strip (27) is sewn to the insole (17).

22. The footwear as claimed in one of claims 16 - 19, in which the second longitudinal side of the gauze strip (27) is fastened to the first string-lasting (45) 20 holding the functional-layer end region (23).

23. The footwear as claimed in claim 22, in which the second longitudinal side of the gauze strip (27) is sewn to the first string-lasting (45) holding the functional-layer end region (23).

24. The footwear as claimed in one of claims 12 - 18 and 21 - 23, in which the outer-material end region (21) is kept essentially parallel to the tread of the outsole (19; 39) by means of a second string-lasting (47).

25. The footwear as claimed in claim 24, in which 30 the outer-material end region (21) is provided with an elastic drawstring, which pulls the outer-material end region (21) toward the center of the outsole.

26. The footwear as claimed in claim 25, in which 35 the elastic drawstring is formed by an elastic string-lasting (47), which has an elastic string (51) which pretensions the outer-material end region (21) toward the center of the outsole.

27. The footwear as claimed in one of claims 12 - 19 and 22 - 26, in which the functional-layer end region (23) is provided with an elastic drawstring, which pretensions the functional-layer end region (23) toward the center of the outsole.
28. The footwear as claimed in claim 27, in which the elastic drawstring is formed by an elastic string-lasting (45), which has an elastic string (51) which pretensions the functional-layer end region (23) toward the center of the outsole.
29. The footwear as claimed in claim 27 or 28, in which the outer-material end region (21) is angled away outward and sewn to the peripheral edge (18; 53; 57) of a sole.
30. The footwear as claimed in claim 29, in which the sole is formed by the outsole (19; 39).
31. The footwear as claimed in claim 29, in which the sole is formed by an intermediate sole (59).
32. The footwear as claimed in claim 31, in which the outsole (39) is fastened to the intermediate sole (59).
33. The footwear as claimed in one of claims 1 - 32, in which a functional layer (15) is provided in the form of a waterproof and water-vapor-permeable functional layer.
34. The footwear as claimed in claim 33, with a functional layer (15) constructed with expanded, microporous polytetrafluoroethylene.
35. The footwear as claimed in one of claims 1 - 34, in which the outsole (19) is essentially in the form of a dish, with a sheet-like tread region and an upturned edge (40) rising up essentially perpendicularly from the latter.
36. The footwear as claimed in one of claims 9 - 34, in which the outsole (39) is essentially in the form of a sheet.
37. A process for producing footwear, having the following production steps:

an upper (11) is created, constructed with an outer material (13) and with a waterproof functional layer (15) at least partially lining the outer material (13) on the inner side of the latter and provided with an upper end region on the sole side;
5 the outer material (13) is provided with an outer-material end region (21) on the sole side and the functional layer (15) is provided with a functional-layer end region (23) on the sole side, the functional-layer end region (23) being provided with an edge region which is not covered by the outer-material end region (21);

an adhesive zone which is closed in the direction of the sole periphery and comprises a reactive hot-melt adhesive (33) which brings about waterproofness when in the fully reacted state is applied to the edge region;
15 an outsole (19; 39) is fastened to the upper end region.

38. The process as claimed in claim 36, in which the edge region (25) is formed by an overhang of the functional-layer end region (23) projecting beyond the outer-material end region (21).

39. The process as claimed in claim 37 or 38, in which the functional-layer end region (23) is tensioned by means of a first string-lasting (45) which is essentially parallel to the tread of the outsole (19; 39).

40. The process as claimed in claim 39, in which the first string-lasting (45) is provided with an elastic string (51), which pretensions the functional-layer end region (23) toward the center of the outsole.

41. The process as claimed in claim 37 or 39, in which the overhang (25) is bridged by a connecting strip of a material permeable to liquid reactive hot-melt adhesive (33) and the reactive hot-melt adhesive (33) is applied to an outer side of the connecting strip.

42. The process as claimed in claim 41, in which a connecting strip is attached in the form of a gauze strip (27).

43. The process as claimed in claim 42, in which a first longitudinal side of the gauze strip (27) is sewn to the outer-material end region (21) and a second longitudinal side of the gauze strip (27) is sewn to the functional-layer end region (23).

44. The process as claimed in one of claims 37 - 43, in which the sole construction is provided with an insole (17).

45. The process as claimed in one of claims 42 - 44, in which the second longitudinal side of the gauze strip (27) is sewn to the insole (17).

46. The process as claimed in claim 39 or 40 and 42, in which the second longitudinal side of the gauze strip (27) is sewn to the string-lasting (45).

47. The process as claimed in one of claims 39 - 46, in which the outer-material end region (21) is tensioned by means of a second string-lasting (47) essentially parallel to the tread of the outsole (19; 39).

48. The process as claimed in claim 40, in which the outer-material end region (21) is angled away outward and fastened to the peripheral edge of a sole.

49. The process as claimed in claim 48, in which the angled-away outer-material end region (21) is fastened to the peripheral region of the outsole (19; 39).

50. The process as claimed in claim 48, in which the angled-away outer-material end region (21) is fastened to the peripheral edge (57) of an intermediate sole (59), to the underside of which the outsole (19; 39) is fastened.

51. The process as claimed in one of claims 48 - 50, with the following production steps:

a) the functional-layer end region (23) is provided with a string-lasting (45) with an elastic string;

b) the overhang (25) of the functional-layer end region (23) is provided on its outer side facing the sole with reactive hot-melt adhesive (33);

5 c) the functional layer (13) provided with string-lasting (45) and reactive hot-melt adhesive (33) is arranged inside the outer material (13);

d) the outwardly angled-away outer-material end region (21) is fastened to the peripheral edge (53; 57) of the sole (39; 59);

10 e) the upper (11) joined to the sole (39; 59) is stretched onto a last (20) in such a way that the reactive hot-melt adhesive (33) comes into contact with the sole (39; 59);

15 f) the reactive hot-melt adhesive (33) is adhesively bonded with the sole (39; 59).

52. The process as claimed in claim 51, in which the outwardly angled-away outer-material end region (21) is adhesively bonded to the peripheral edge (53; 57) of the sole (39; 59).

20 53. The process as claimed in claim 51 or 52, in which the outwardly angled-away outer-material end region (21) is sewn to the peripheral edge (53; 57) of the sole (39; 59).

54. The process as claimed in one of claims 51 - 25 53, in which the angled-away outer-material end region (21) is fastened to an intermediate sole (59).

55. The process as claimed in claim 54, in which a) the upper (11) having the outer material (13) and the functional layer (15) is stretched over a last (20);

30 b) the outwardly angled-away outer-material end region (21) is adhesively bonded to the peripheral edge (57) of the intermediate sole (59);

c) the outer (11) is removed from the last (20);

35 d) the outwardly angled-away outer-material end region (21) is sewn to the peripheral edge (57) of the intermediate sole (59);

e) the upper (11) sewn to the intermediate sole (39) is stretched once again onto the last (20) in such a way

that the reactive hot-melt adhesive (33) comes into contact with the intermediate sole (59);

f) the reactive hot-melt adhesive (33) is adhesively bonded with the intermediate sole (59).

5 56. The process as claimed in one of claims 51 - 53, in which the outwardly angled-away outer-material region (21) is fastened to the outsole (19; 39).

57. The process as claimed in claim 56, in which

10 a) the outwardly angled-away outer-material end region (21) is adhesively bonded to the peripheral edge (53) of the outsole (19; 39);

b) the outwardly angled-away outer-material end region (21) is sewn to the peripheral edge (53) of the outsole (19; 39);

15 c) the upper (11) sewn to the outsole (19; 39) is stretched over a last (20) in such a way that the reactive hot-melt adhesive (33) comes into contact with the outsole (19; 39);

20 d) the reactive hot-melt adhesive (33) is adhesively bonded with the outsole (19, 39).

58. The process as claimed in one of claims 55 - 57, in which, after the adhesive bonding of the reactive hot-melt adhesive (33) and the removal of the last (20) from the upper (11), an insole (55) covering
25 the functional-layer end region (23) and the sole (19; 39; 59) is attached inside the functional layer (15).

59. The process as claimed in one of claims 37 - 47, in which, after being applied to the overhang (25) or the gauze strip (27), the reactive hot-melt adhesive
30 (33) is pressed against the surface of the overhang (25) or of the gauze strip (27) by a pressing device (53) with a pressing surface not adhesively bonding with the reactive hot-melt adhesive (33).

60. The process as claimed in one of claims 37 -
35 59, in which a reactive hot-melt adhesive (33) which can cure by means of moisture is used, being applied to the region to be sealed and exposed to moisture to make it fully react.

61. The process as claimed in claim 60, in which a reactive hot-melt adhesive (33) which can be thermally activated and can be cured by means of moisture is used, being thermally activated, applied to the region
5 to be sealed and exposed to moisture to make it fully react.

62. The process as claimed in claim 59 or 60, in which a reactive hot-melt adhesive (33) which can be thermally activated is applied in the non-activated
10 state to the overhang (25) and is thermally activated only at the time at which the adhesive bonding of the reactive hot-melt adhesive (33) is intended to take place.

63. The process as claimed in claim 62, in which
15 reactive hot-melt adhesive (33) which contains particles which can be heated by means of irradiation is applied to the overhang (25), radiation heating the particles being directed onto the reactive hot-melt adhesive (33) at the time at which the adhesive bonding
20 of the reactive hot-melt adhesive (33) is intended to take place.

64. The process as claimed in claim 62 or 63, in which reactive hot-melt adhesive (33) containing metal particles is used and microwave radiation is directed
25 onto the reactive hot-melt adhesive (33).

65. The process as claimed in claim 62 or 63, in which reactive hot-melt adhesive (33) containing carbon particles is used and infrared radiation is directed onto the reactive hot-melt adhesive (33).

30 66. The process as claimed in one of claims 37 - 65, in which a waterproof and water-vapor-permeable functional layer (15) is used.

67. The process as claimed in claim 6, in which a functional layer (15) constructed with expanded,
35 microporous polytetrafluoroethylene is used.